

## Effects of Tai Chi and Yoga with Green Tea Supplementation on Selected Biochemical Variables among Obese Men

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### Abstract

The purpose of the study was find out the effects of tai chi and yoga with green tea supplementation on selected biochemical variables among obese men. Forty five obese men selected from Chennai District, Tamil Nadu selected as subjects. Their age ranged between 30 and 40 years. They were randomly divided in to 3 equal groups namely experimental group I, experimental group II and control group. Biochemical variables such as fasting blood glucose and high density lipoproteins were selected as dependent variables. Experimental group I underwent tai chi with green tea supplementation, experimental group II underwent yoga with green tea supplementation and group III acted as control group for the period of 16 weeks. Prior to and after the training period the subjects were tested for fasting blood glucose and high density lipoproteins. Fasting blood glucose and high density lipoproteins was measured through the blood test. Analysis of Covariance was applied as statistical tool. The result of the study has shown that the yoga with green tea supplementation and tai chi with green supplementation has significantly improved the fasting blood glucose and high density lipoproteins.

**KEYWORDS:** Tai chi, yoga, green tea supplementation, fasting blood glucose and high density lipoproteins.

### INTRODUCTION

Obesity is defined as abnormal or excessive fat accumulation that poses a risk to health. Exercise is a key component in the prevention of obesity. This is a condition in which energy intake, in the form of food, exceeds the energy expenditure of daily living and the excess energy is stored in the form of adipose tissue made up of fat cells. Two factors facilitate the onset and progressive nature of obesity. The first is the age related reduction in the energy expended to maintain waking bodily functions the basal metabolic rate of about 2% every 10 years. The second is the lowered metabolic rate of obese individuals. Combine these two factors with reduced physical activity and the development of obesity is inevitable.

Yoga is an immediate knowledge and direct perception of the depth of the universe and the rules of nature. Yoga aims to attain the unity of mind, body, and spirit through exercise (asana), breathing (pranayama), and meditation (shavasana) (Villien et al., 2005). Regular yoga exercises can promote good physical and mental health (Hittleman, 2013). It consists of a series of exercises including stretching, endurance, balance, high density lipoproteins, concentration, and breathing. Several health benefits have been reported for yoga exercises, including increased joint range of motion, lower blood pressure, reduced respiration rate, endurance, cardiopulmonary fitness, enhanced body high density lipoproteins, improved muscle

endurance and endurance, improved balance (Fan and Chen, 2011), and increased agility, power, and speed (Gaurav, 2011).

### **STATEMENT OF THE PROBLEM**

The purpose of the study was find out the effects of tai chi and green tea supplementation on selected biochemical variables among obese men.

### **HYPOTHESES**

1. It was hypothesized that there would be significant improvement on selected biochemical variables among obese men due to the 16 weeks tai chi and yoga with green tea supplementation
2. It was hypothesized that experimental group II yoga with green tea supplementation would being significant improvement than experimental group I on selected biochemical variables among obese men due to the 16 weeks yoga with green tea supplementation.

### **RELATED LITERATURES**

**Chidambara Raja (2012)** investigated 30 male students studying in University in the age group of 18-25 years . They were divided into two equal groups, in which group-I underwent yoga practice and group-II acted as control group for 13 weeks. Prior to and after the training period the subjects were tested for high density lipoproteins, total cholesterol and blood pressure. Analysis of Covariance was applied as statistical tool. The results of the study has shown that the yoga practice group has improved the high density lipoproteins and also blood pressure (both systolic and diastolic) and there was no significant decrease in total cholesterol after the yogic practice.

**Shankardayalan (1996)** investigated 50 male students and divided into two groups of equal group. One group was utilized as control group and the other group as experimental for eight weeks. The data on aerobic capacity, sit-ups, high density lipoproteins and percentage body fat were obtained before pre test and after post test the experimental period. The obtained 'F' ratio was tested for significance at 0.05 level of confidence. The found out measure all the variables such as aerobic capacity, fasting blood glucose, high density lipoproteins and percent body fat in favour of experimental group. It concluded that the aerobic capacity was increased, and the fasting blood glucose was improved. High density lipoproteins was developed. The significant difference was found in percent body fat of yogasana practice programme.

### **METHODOLOGY**

Forty five obese men were selected from the Chennai District, Tamil Nadu and their age ranged between 30 and 40 years. They were randomly divided in to 3 equal groups namely experimental group I, experimental group II and control group. Biochemical variables such as fasting blood glucose and high density lipoproteins were selected as dependent variables. Experimental group I underwent tai chi with green tea supplementation, experimental group II underwent yoga with green tea supplementation and group III acted as control group for the period of 16 weeks. All subjects of experimental groups were received to green tea extract (Lipton, India) at one package per day with the morning for 16 weeks. One green tea package contains 1.2g green tea. All subjects were instructed to maintain an isocaloric diet and to continue their previous eating habits during the study. Subjects did not change their diet during the study. The exercise and daily eating regimes were comparable in both groups. At prior to and after the training period the subjects were tested for fasting blood glucose and high density lipoproteins. Fasting blood glucose and high density lipoproteins was measured through blood sample analysis.

**STATISTICAL TECHNIQUE**

The Analysis of Covariance (ANCOVA) statistical technique was used to find out the effect of tai chi and yogic practices with green tea supplementation on selected biochemical variables among obese men. If the test is significant the Scheffe’s post hoc test will be use to find out the paired mean significant difference (Thirumalaiswamy, 1998).

**RESULTS AND DISCUSSION**

**Table I - Computation of Analysis of Co-Variance on Fasting Blood Glucose**  
(Scores in mg/dl)

MEANS	EX GR I	EX GR II	CON GP	SV	SS	DF	MS	OF	TF
Pre test mean	99.89	105.55	102.13	B	244.04	2	122.02	1.03	3.22
				W	4959.20	42	118.08		
Post test mean	92.48	92.33	101	B	739.73	2	369.87	4.05*	3.22
				W	3839.07	42	91.41		
Adjusted post test mean	94.56	89.94	101.30	B	967.53	2	483.77	27.45*	3.23
				W	722.67	41	17.63		

\*Significant

Table I shows that the pre the obtained ‘F’ ratio was 1.03 lesser than the table ‘F’ ratio of 3.22. The post test obtained ‘F’ ratio was 4.05 higher than the table ‘F’ ratio of 3.22. The adjusted post test obtained ‘F’ ratio was 27.45 greater than the table ‘F’ ratio of 3.23. Hence, post test and adjusted post test were significant at 0.05 level.

**Table II - Computation of Scheffe’s Post Hoc Test Ordered Adjusted Final Mean Difference of Fasting blood glucose**  
(Scores in mg/dl)

Con Group	Exp Group -I	Exp Group-II	Mean Difference	Confidence Interval
101.30	94.56	-	6.74*	3.90
101.30	-	89.94	11.36*	3.90
-	94.56	89.94	4.63*	3.90

\* Significant

The comparison between the Control Group and Experimental Group I mean difference 6.47 was higher than the confidence interval value of 3.90. Hence the comparison was significant at 0.05 level. The comparison between the Control Group and Experimental Group II mean difference 11.36 was higher than the confidence interval value of 3.90. Hence the comparison was significant at 0.05 level. The comparison between the Experimental Group I and Experimental Group II mean difference 4.63 was higher than the confidence interval value of 3.90. Hence the comparison was significant at 0.05 level.

**Table III - Computation of Analysis of Co-Variance on High density lipoproteins**  
(Scores in mg/dl)

MEANS	EX GR I	EX GR II	CON GP	SV	SS	DF	MS	OF	TF
Pre test mean	45.40	45.87	47.33	B	30.53	2	15.27	0.49	3.22
				W	1306.67	42	31.11		

<b>Post test mean</b>	49	51.60	46.47	<b>B</b>	197.64	2	98.82	3.46*	3.22
				<b>W</b>	1199.33	42	28.56		
<b>Adjusted post test mean</b>	49.67	51.88	45.49	<b>B</b>	312.47	2	156.23	29.04*	3.23
				<b>W</b>	220.61	41	5.38		

\*Significant

Table I shows that the pre the obtained 'F' ratio was 0.49 lesser than the table 'F' ratio of 3.22. The post test obtained 'F' ratio was 3.46 higher than the table 'F' ratio of 3.22. The adjusted post test obtained 'F' ratio was 29.04 greater than the table 'F' ratio of 3.23. Hence, post test and adjusted post test were significant at 0.05 level.

**Table II - Computation of Scheffe's Post Hoc Test Ordered Adjusted Final Mean Difference of High Density Lipoproteins**

<b>Exp Group-II</b>	<b>Exp Group -I</b>	<b>Con Group</b>	<b>Mean Difference</b>	<b>Confidence Interval</b>
51.88	49.67	-	4.21*	2.15
51.88	-	45.49	6.40*	2.15
-	49.67	45.49	2.20*	2.15

\* Significant

The comparison between the Experimental Group II and Experimental Group I mean difference 4.21 was higher than the confidence interval value of 2.15. Hence the comparison was significant at 0.05 level. The comparison between the Experimental Group II and Control Group mean difference 6.40 was higher than the confidence interval value of 2.15. Hence the comparison was significant at 0.05 level. The comparison between the Experimental Group I and Control Group mean difference 2.10 was higher than the confidence interval value of 2.15. Hence the comparison was significant at 0.05 level.

## DISCUSSION OF HYPOTHESIS

The first hypothesis stated that there would be significant improvement on selected biochemical variables among obese men due to the 16 weeks tai chi and yoga with green tea supplementation. The results presented on the table I and III shows that significance difference between pretest, posttest and adjusted post test on fasting blood glucose and high density lipoproteins among obese men due to 16 weeks tai chi and yogic practices with green tea supplementation. Hence, the hypothesis was accepted at 0.05 level of confidence.

The second hypothesis stated that Experimental group II would have significant improvement than experimental group I on selected biochemical variables among obese men due to the 16 weeks yoga with green tea supplementation. The results presented on the table II and IV shows that significance difference between experimental group I and experimental group II on fasting blood glucose and high density lipoproteins among obese men due to 16 weeks yogic practices with green tea supplementation. Hence, the hypothesis was accepted at 0.05 level of confidence.

## CONCLUSION

Within the limitations of this study and based on the results, it was concluded that fasting blood glucose and high density lipoproteins has significantly improved by tai chi and yogic practice with green tea supplementation. It was concluded from the results of the study that the yoga practice group with green tea supplementation

showed significant improvement in fasting blood glucose and high density lipoproteins when compared with a tai chi group with green tea supplementation and control group.

### **REFERENCES**

Fan JT and Chen KM (2011). Using silver yoga exercises to promote physical and mental health of elders with dementia in long-term care facilities. *International Psychogeriatrics*, 23, 1222-1230.

Hittleman R (2013). *Yoga for Health* (Ballantine Books).

Gaurav V (2011). Effects of Hatha Yoga training on the health-related physical fitness. *Journal of Sports Science and Engineering*, 5, 169-173.

Chidambara Raja (2012). Effect of yogic practices on high density lipoproteins cholesterol and blood pressure. *International Interdisciplinary Research Journal*, 2 (6), 221-225

Villien F, Yu M, Barthelemy P and Jammes Y (2005). Training to yoga respiration selectively increases respiratory sensation in healthy man. *Respiratory Physiology & Neurobiology*, 146, 85-96.

Thirumalaisamy R (1995). **“Statistics in Physical Education”**, Karakudi, Senthil Kumar Publisher, PP. 108-112.